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AUTHOR Burns, James A.
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ABSTRACT

The effectiveness of existing contingency planning efforts at five community colleges, three colleges, and five universities during the Mount St. Helens eruptions in 1980 in Washington state was assessed. Planning efforts in the areas of institutional policy, academic policy, business office, physical plant, residence halls, financial aid, and safety and security were reviewed. The first institutional policy activity is the assignment of broad areas of responsibility to specific departments and individuals: this should include the creation of a crisis management team. The decision to close a campus requires a policy decision on whether or not staff will be paid while the school is closed. Another consideration is enforcement of the closing: faculty on some campuses came to work undisturbed, and ash was brought into the buildings. The academic impact of institutional closure (especially in grading) should be considered, along with problems resulting to research in progress at the campuses from interruption of electrical power, violation of controlled environments, and disruption of time series experiments. The most important activity for the business office is to make sure that all expenditures are fully documented. One school caused considerable damage to their roofs by the cleanup procedure they followed. Recommendations are offered to help institutions develop contingency plans for natural hazards and disasters, and the advantage of having tested plans with mock disasters is stressed. (SW)

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CONTINGENCY PLANNING FOR NATURAL DISASTERS: THE MOUNT ST. HELENS EXPERIENCE

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JAMES A. BURNS
PLANNING ANALYST
OFFICE OF INSTITUTIONAL RESEARCH
WESTERN WASHINGTON UNIVERSITY
BELLINGHAM, WASHINGTON 98225
TELEPHONE: (AREA 206) 676-3566

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This paper was presented at the Twenty-First Annual Forum of the Association for Institutional Research held at the Leamington Hotel in Minneapolis, Minnesota, May 17-20, 1981. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Mary Corcoran
University of Minnesota
(Editor, AIR Forum Publications)

Abstract

The May 18, 1980 and subsequent eruptions of Mount St. Helens in Washington State provided an opportunity to determine the effectiveness of existing contingency planning efforts at five community colleges, three colleges and five universities. A review is made of planning efforts in the areas of institutional policy, academic policy, business office, physical plant, residence halls, financial aide, and safety and security. Recommendations are made in each area that would benefit any college or university's efforts to develop contingency plans for natural hazards and disasters. The advantage of having tested plans with mock disasters is stressed. Included is a map of the institutions in the heavy ashfall area and a summary of estimated and reimbursed costs for Washington community colleges.

Introduction

At 8:32 a.m. on Sunday morning May 18, 1980 Mount St. Helens began its most famous eruption. An hour and a quarter later a dense cloud of ash had reached the town of Yakima, Washington. By 1:00 p.m. the ash cloud had reached the Idaho state line blocking out the sun in most of southeastern Washington and leaving thousands of people with a unique and unprecedented emergency. Along with federal, state and municipal officials, administrators at more than a dozen colleges and universities were given an opportunity to put into practice contingency plans developed for natural disasters or other emergencies. First they had to figure out what was happening, then they had to find those contingency plans, then they had to determine what, if anything in their plans, applied to the immediate situation.

The institutions caught in the path of the ash cloud and forced to close for two or more days were of various sizes and affiliations including five public community colleges, two private colleges, one private university, two masters-level public universities and two major research universities. All of these schools are listed on Table 1 and are located on the ashfall map (Figure 1). There are also a wide difference in the types of preparation made at the schools and the impact of the ashfall upon them. Two of the universities had ended their spring terms and were already closed. None of the institutions anticipated anything like the actual emergency so each school presents a good test of responses to a sudden natural disaster. In the end, the ashfall had a direct affect on over 64,000 students but caused no fatalities. Property damage was significantly less than early estimates, although the long-term affects of increased depreciation for both plant and equipment will probably never be documented.

The information for this paper was collected via telephone interviews

TABLE 1

COLLEGE AND UNIVERSITIES AFFECTED BY MT. ST. HELENS ASHFALL MAY 18, 1980

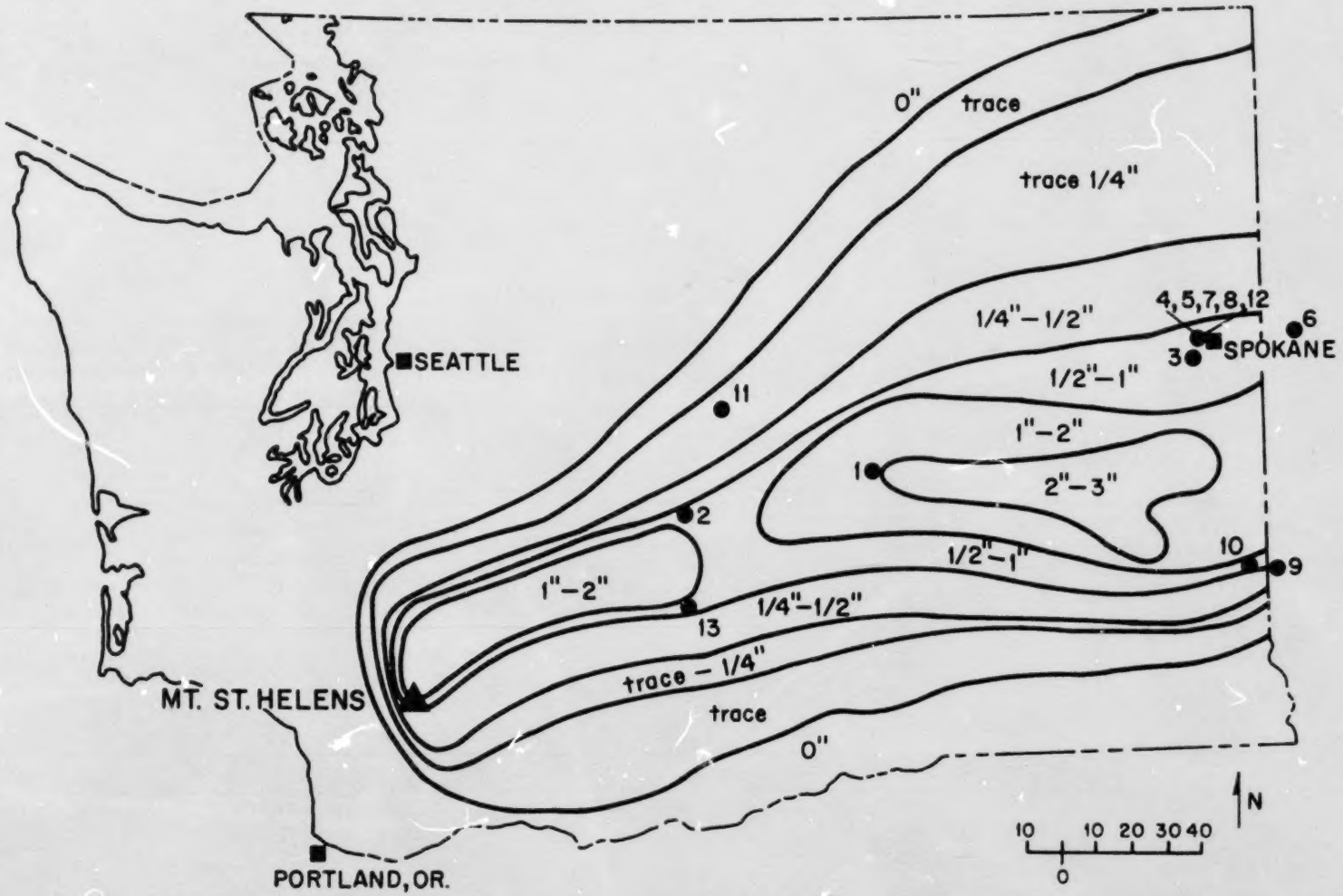
Location Number	Institution	Headcount Enrollment (1978-79)	A.A.U.P. Category	Location	Closing
1	Big Bend Community College	2,598	IV	Moses Lake, WA	10 days
2	Central Washington University	7,900	IIA	Ellensburg, WA	4 days
3	Eastern Washington University	6,887	IIA	Cheney, WA	5 days
4	Fort Wright College	522	IIA	Spokane, WA	4 days
5	Gonzaga University	2,966	IIA	Spokane, WA	2 days[1]
6	North Idaho College	2,330	IV	Coeur d'Alene, ID	4 days
7	Spokane Community College	9,079	IV	Spokane, WA	5 days
8	Spokane Falls Community College	10,975	IV	Spokane, WA	5 days
9	University of Idaho	7,676	I	Moscow, ID	3 days[2]
10	Washington State University	16,665	I	Pullman, WA	4 days
11	Wenatchee Valley College	3,216	IV	Wenatchee, WA	None
12	Whitworth College	1,688	IIA	Spokane, WA	3 days
13	Yakima Valley Community College	5,536	IV	Yakima, WA	4 days

[1] Academic term ended May 9, 1980

[2] Academic term ended May 16, 1980

Figure I

ASH FALL ACCUMULATION AND HIGHER EDUCATION INSTITUTIONS EFFECTED BY MT. ST. HELENS ERUPTION MAY 18, 1980



with key personnel in one or more of the following areas: academic affairs, physical plant, maintenance and operations, president's office, business office, safety and security. Institutional research offices at all of the colleges and universities in the ashfall zone where accumulations were one-fourth inch or more also were contacted. Most of the schools provided copies of their formal contingency plans, if such plans had been developed. Additional information came from relevant staff at the state and federal levels including Corps of Engineers, Federal Emergency Management Authority (FEMA), Regional Financial Aid Administrators, Washington State Board for Community College Education, Library of Congress, Natural Hazards Center, United States Geological Survey (USGS), National Health Service, Washington Council for Postsecondary Education and Washington Emergency Services Administration. Documentation includes official FEMA Damage Survey Reports, state planning guidelines, Mount St. Helens Technical Reports, Center for Disease Control Bulletins, USGS and Washington State Geological Reports and a search of Educational Resources Information Center (ERIC) documents.

Background

The most common planning document in Washington was one developed by the State Board for Community College Education (SBCCE). It consists of a glossary describing the various types of emergencies, an outline of Standard Operating Procedures (SOP) for any emergency, a list of equipment on each campus and a list of facilities on each campus. The equipment list includes such items as radios, trucks, earthmoving equipment, generators, pumps, tools and boats. The facilities list describes maximum extra housing and food service capacities at different times in the academic year. All institutions are encouraged to establish a disaster liaison officer who coordinates the initial analysis of a situation and initiates the necessary

reporting documentation. The basic SOP documentation is intended to be more fully developed on each campus and expanded to include appropriate notification and other actions in case of weather-related emergencies, bombs, riots, radiation leakage, accidents, injuries or fatalities. The degree to which the SOP's are developed is different on each campus but all have some sort of contingency plans particularly for the most likely problems such as closign or scaling down operations for heavy snowfall.

The Ashfall

When Mount St. Helens exploded a huge amount of material (.77 cubic miles) was heated and foreced into the atmosphere. Although the distribution covered a very large area, the largest concentration of this material was desposited roughly 175 miles to the east in the direction of the blast and the prevailing winds. All of the material expelled into the skies is described as ash, and its subsequent settling on a half of the state, and well beyond, is referred to as ashfall. Roughly forty-percent of the ash (.33 cubic miles) came down in Washington State. Fine, windborn particles in the ashcloud were subsequently tracked all the way around the planet.

Those who experienced the ashfall say that the sky darkened as though a tornado was approaching and then the ash began to fall like snow. In the areas of heavy ashfall the sky stayed dark all day Sunday as ash continued to fall, but Monday was a bright clear spring day. The only problem was the accumulation of up to three inches of ash that swirled into the air as dust clouds with even the lightest winds, including the disturbances caused by the passing of a car or people walking.

The physical characteristics of the ash vary according to the distance from the mountain that it came down. The largest pieces are very close to the mountain and the small particles are distributed in proportion to the depth of ash accumulation. The largest particles are located in the

heaviest ash accumulation areas. The particle size gradually decreases until the areas with one-half inch or less accumulation the ash has the consistency of talcum powder. In all ashfall regions there is a range of particle sizes from smaller than 0.001 millimeters (so fine that it can't be felt) to about 0.3 millimeters. The abrasiveness of some of the substances in the ash is similar to or slightly greater than that of finely crushed window glass. The chemical composition is similar to a low grade fertilizer with no dangerous concentrations of potentially harmful acids and salts[1]. An accurate analysis of the size and composition of the ash particles is necessary to determine proper filters and potential dangers from the chemical elements that make up the ash.

Institutional Policy Area

The first institutional policy activity is the assignment of broad areas of responsibility to specific departments and individuals; this should include the creation of a crisis management team. It is also important to ensure that team members have copies of contingency plans at home, as well as in their offices. The Sunday eruption meant that even those who had made plans were unable to act quickly because the plans were in their offices on campus and not immediately available. Communication was also a problem. Most campus switch boards quickly were jammed, particularly at the residential universities. Special phone lines, such as an unlisted number in the president's office or the security office, were suggested by several officials as a means of maintaining crisis team communications. The use of a "communications tree", in which each individual who is contacted notifies several others, was also recommended as a rapid means of getting messages to key people.

The decision to close did not come about smoothly at most schools. There seemed to have been two reasons for this. First, the ashfall was deceptive.

Monday morning was a sunny spring day with clear skies in eastern Washington. It wasn't until people started moving around that the ash was stirred up and the extent of the cleanup problems were apparent. The other difficulty was procedural. Colleges and universities do not often close for snow in the manner of elementary and secondary schools. Since it was difficult to gauge the extent of the problems created by the ashfall, it was a day-by-day decision to reopen or stay closed, although in some cases local requests for business closings were used as guidelines. Implications for academic affairs, residence halls and food service will be covered in later sections.

The decision to close a campus requires a policy decision on whether or not staff will be paid while the school is closed. There was some confusion on this point in Washington with individual schools in the public sector making a full range of rulings from no work, no pay, to full pay for all. In the end, the State Higher Education Personnel Board ruled that all employees had to be paid and that those who actually worked were to be awarded compensating time off. The primary rationale for this decision seemed to be that this was the most pragmatic solution since keeping employees off campus speeded cleanup, and in many cases the employees had already been paid by the time the decision was made. However, it was clear that an explicit institutional policy could have protected these colleges from having to pay for services not received. There are valid rationales for either paying or not paying staff in such circumstances and the appropriate policy for each school can be established in advance. Outside of the crisis atmosphere it is possible to review the implications of pay policy in terms of regulatory structures, collective bargaining, humanitarian concerns and budgetary impact (any disaster is going to make somebody put in overtime, perhaps recaptured wages could cover some of the extraordinary expenses).

Another consideration in closing the campus is enforcement of the closing. On several campuses that were closed, faculty took it as an opportunity to come in and work undisturbed, after all they have keys to their buildings. This meant that ash was tracked through buildings, windows were opened and more ash entered, and the cleanup was needlessly complicated. Signs in building lobbies would have helped explain both that buildings should be kept sealed and the potential for damage from the fine ash. Keeping cars off campus was another consideration.

Public relations offices were also caught off guard. Washington State University got a lot of bad press locally and nationally[2] because of a hastily developed and apparently unnecessary emergency leave policy. Basic public relations can be determined in advance with statements prepared to assure parents and the public that no students have been injured, and all precautions have been taken to ensure the continued good health of all members of the college community. In the event of injury or fatality the circumstances and extent of causative factors should be communicated quickly to control rumors and panic reactions. Details of preformatted press releases should reflect the extent and individuality of contingency plans at each institution. The existence of such public relations groundwork relieves another burden from those who must make the decisions that cannot be anticipated in an emergency.

Academic Policy Areas

The academic impact of institutional closure should be considered. Some schools may still have applicable policies in force dating from the era of Viet Nam protests. The ashfall occurred at the worst part of the academic cycle for several schools, finals week. With campuses closed or some faculty and students unable to get to campus the most common solution to the problem of how to determine final grades for courses in progress was to leave the decision

to each professor. Usually either a letter grade was awarded without a final exam or the course became an incomplete. There was some student dissatisfaction expressed with this approach which might have been answered by letting the student choose between taking a final or accepting the grade as of the interruption point. Most of the schools closed also shortened the exam week or extended the term to minimize complications.

Research in progress constitutes a major area of concern whenever there is a possibility of having electrical power interrupted, controlled environments violated, or time series experiments disrupted. Very few problems of this type occurred since there was no disruption of electrical power although the possibility was very real. Special provisions were made for animal quarters at Washington State University and several schools reported covering delicate instruments. In general, physical plant people should always be kept aware of special situations in labs. Standby power sources should also be provided for important and delicate projects in much the same way that such provisions are made for health care facilities.

One area that is sometimes overlooked is the use of available faculty expertise. At the University of Idaho the Home Economics Department issued one of the first regional bulletins on cleanup procedures[3]. Washington State University followed with very prompt studies of the effect of ash on animals[4]. Although the University of Washington was not affected, much of the early analysis of ash was done there. These activities fall in the areas of general research and public service. Organizational barriers sometimes keep administrators from going to the faculty on their own campuses in times of crisis. I didn't hear of any cases where working with faculty created problems and in some instances, such as immediate analysis of ash content some false starts could have been avoided with a prompt on the spot analysis. Keep in mind the value of your own experts on campus in the development of contingency plans.

Business Areas

The most important activity for the business office is to make sure that all expenditures relating to a disaster are fully documented. The best procedure is to set up a special series of account codes which can be used to document expenses. Emergency relief funds were available from several federal agencies and the applications for reimbursement or services were coordinated through FEMA. Like any other bureaucratic endeavor it is important to be able to document how many people worked where, for how long, doing what and with what type of equipment. This means that overtime for regular employees, all time for special crews, equipment rental or leasing, any extraordinary maintenance, special supplies used and all damage directly related to the disaster need solid documentation. Many states self-insure, which can create problems in substantiating the value of items destroyed. The agencies and programs coordinated by FEMA have several levels of appeal and are subject to change through both interpretive and legislative avenues. What this means is that your only chance for reimbursements is full documentation. Field supervisors in particular should be made aware of the need for good work-logs.

Care also should be exercised not to panic and complicate the cleanup or repair by not following the best available procedures. Although there is a difference of opinion between the officials involved, one school caused several hundred thousand dollars damage to their roofs by using a cleanup procedure that destroyed the roofing surface. The school said they were concerned about the load bearing capabilities of the roof, that they had no choice but to get the ash off as quickly as possible or loose the building. FEMA held that other procedures were available, and the school caused unnecessary damage. They were not reimbursed. As an example, Table 2 shows the estimated costs of the ashfall for all Washington Community Colleges and the actual reimbursement, less than 25% overall. Several factors are involved in the repayment

TABLE 2

ESTIMATED COST AND ACTUAL PAYMENT IMPACT OF ASHFALL FOR WASHINGTON COMMUNITY COLLEGE SYSTEM[1]

College & Location	Labor[2]	Equipment Use	Repairs	Other	Estimated Total Cost	Actual Payment[3]
Wenatchee Valley C. Wenatchee	$ 3,000	$ 8,000	$ -	$ 2,200	$ 13,200	$ 534
Yakima Valley C. Yakima	6,300	4,600	102,300	4,600	117,800	20,302
Big Bend C.C. Moses Lake	14,200	175,400	117,400	4,100	311,100	137,361
Spokane C.C. & Spokane Falls C.C. Spokane	50,600	9,400	579,300	15,100	654,400	56,632
Columbia Basin C. Pasco	-	-	5,000	-	5,000	
Walla Walla C.C. Walla Walla	2,600	-	24,900	5,200	32,700	
Olympia College Bremerton	-	-	4,600	8,900	13,500	
Grays Harbor C Aberdeen	700	700	3,900	800	6,100	2,372
Centralia College	29,400	3,000	8,400	3,100	43,900	41,205
Lower Columbia C. Longview	8,200	7,300	8,200	2,500	26,200	20,217
Clark College Vancouver	3,700	700	6,700	500	11,600	27,736[4]
Skagit Valley C.	-	-	500	-	500	
Green River C.C. Auburn	900	-	600	1,300	2,800	
TOTAL SYSTEM	$119,600	$209,100	$861,800	$ 48,300	$1,238,800	$306,359

[1] As reported on 5/27/80 State Board for Community College Education.

[2] Excludes regular-time wages/salaries of college work crews.

[3] As per Disaster Survey Reports.

[4] All payment is for damage cause by May 25,1980 eruption.

rate in addition to poor documentation. First, estimates included repaving of roads and parking areas that turned out not to be needed. The estimates anticipated more vehicle and equipment damage than occurred and early wearing out of vehicles or engines was not covered. The actual time required for clean-up was then still unknown. Granting all of that, it is still obvious that disaster aid is not generous so institutions should make every reasonable effort to follow procedures that will maximize reimbursement.

Physical Plant Area

The Physical Plant people were unsung heroes on every campus that I reviewed. There were many stories of maintenance people walking to campus to shut down ventilating systems, close windows and make other efforts to protect buildings without being asked. Yankee ingenuity was everywhere evident in the modifications made to equipment and the procedures developed to cleanup and get rid of ash. False starts occurred, but within a day the cleanup operation was moving well. The crews worked long hours over many days continuing cleanup operations long after the campuses had been reopened. It was the housekeeping, maintenance and operations and the buildings and grounds crews that had the largest responsibilities, and they fulfilled them well.

The first area of concern in the physical plant is the maintenance of the infrastructure. Water, heat and power must be provided. Sewage must be pumped out and garbage removed. Initial fears with the ashfall included contamination of water supplies and the loss of electrical power. Wet ash is a fairly good conductor of electrical current and there is a good case to be made, in theory, that ashfall followed by rains could create power outage problems. However, none of the ashfalls to date have caused electrical problems and the ash has proven to be non-toxic. Hosing ash off of roofs

and other areas into storm sewers created blockages. At one college a major portion of the cleanup work involved repairing drain and storm sewer lines that had existing minor cave-ins and root blockages which led to complete blockages when the attempt was made to wash the heavy ash through. The repairs required locating the blockage then digging up and clearing or replacing pipes.

Keeping buildings free of ash inside and out was the next priority. The ash acts as an abrasive cutting up carpets, scoring floors and damaging anything with moving parts including air circulation systems. The first rule to evolve was that cleaning had to be done from the top down: first roofs, and trees, then sides of buildings, windows and shrubs, with walkways and grounds last. Sweeping, shoveling and washing with fire hoses all proved to be effective methods of removing the ash. Air circulation systems were shut down at most locations as soon as the ash started to fall, then turned back on when the ash was on the ground and used with frequent, in some cases hourly, filter changes.

One of the unique features of the ashfall emergency was that it had no real clear cut end point. After the initial accumulation of ash ended, the first cleanup continued in varying degrees all through the summer. Even in late August, when there were no visible traces of the ash in most populated areas, lawnmowers on dry lawns were stirring up mini-dust clouds. To control this, many campuses simply increased their watering schedules through the entire summer.

Vehicle maintenance is a topic that generated some conflicting information. Several manufacturers developed very high maintenance schedules for vehicles exposed to ash. If enough of the ash makes it through the carburetion system, the high temperatures of combustion melt the ash so that it forms a fused glass coating on the inside of cylinder walls rendering the engine useless.

The Washington State Patrol lost many vehicles this way. On campuses the general feeling was that the very high maintenance procedures were unnecessary. Keeping vehicle use to a minimum, keeping speeds down (10 M.P.H. or so) and changing filters whenever they became clogged worked to keep vehicle damage very low at all of the affected colleges and universities. Work has been done with experts in farm machinery design at Washington State University to develop and install air filter systems, similar to those used on equipment like wheat harvesters, on security vehicles and other emergency equipment that could be needed if there are ashfalls in the future.

Residence Halls

When a campus closes, there are still provisions that must be made for those students living on campus. In the case of the ashfall, the problems were primarily communications and recreation. Communications entailed explaining what had happened, what procedures should be followed and what actions the university or college was going to initiate both for completing the school year and cleanup. At Washington State University, the first response, sending sound trucks through the campus warning people to stay indoors, probably did more to create panic than anything else. Communications via printed flyers and word of mouth through residence hall staff proved more effective at other campuses.

Outdoor activities were not possible and with no classes in session, something more than studying was needed to occupy the students. Student Union Buildings were kept open on all campuses. At Central Washington (CWU) the entire indoor athletic complex was kept open. The CWU decided that it was better to sacrifice all of the hardwood floors, which did

have to be refinished, than to leave the students with nothing to do. Impromtu movie festivals were organized and other events were developed by the student affairs staff. One possibility that doesn't seem to have gotten much application was the creation of a quick lecture series on volcanoes or the use of other faculty to provide lectures. Well after the fact, several presentations on Mount St. Helens were done by the various universities. The University of Washington's presentation features excellent films and comments by scientists involved in the study of Mount St. Helens through all of its phases.

Central Washington University also opened its dorms to travelers who were stranded. The ashfall was thought of as much more of a nuisance than a disaster at CWU. This was because the university has participated in mock wreck and disaster drills originated by city agencies. They have also had to provide emergency shelter in the past on many occasions. CWU is located near the major Cascade Mountain Pass (Snoqualmie Pass) in Washington; often University works with city and state agencies to provide shelter for travelers when the pass is closed for a day or two during winter storms. The CWU procedures include providing special parking areas and bus service to the campus for those stranded.

Financial Aid

Work study funds were available to pay students who worked on cleanup crews. This meant that crews recruited from the student body had to be qualified for work study or the college might have to absorb a larger portion of their wages. Special financial aid packages were also developed for students whose parents had suffered heavy losses in the ashfall so the students would not be forced to drop out of school. The funds were not widely applied for, however.

Safety and Security

The first response to any emergency is through the campus security office. All procedures for emergencies have to be available to the security staff. Coordination should be by the institutional crisis management team but the security staff will be the ones who contact team members and initiate at least some of the campus measures to control or minimize the emergency. Physical barriers may have to be erected to close the campus. Escorts will be needed for officials there may be a need for a crowd control or guards to prevent looting. Security staffs on most campuses reported a dissatisfaction with the coordination of responses to the ashfall. This was partially because state and local emergency services agencies geared up rather rustily and partially because most campuses didn't have crisis teams, command posts or other unequivocal sources of direction for coping with the ash.

Conclusions

Campus reactions to the ashfall were no worse, and in some cases much better, than the actions of local governments. This does not mean that there was no room for improvement. Central Washington University had the most trauma-free response to the ashfall with most officials emphasizing that "nuisance" was really the most accurate term to describe the incident. Participation in municipal training drills and occasional duty as an emergency shelter station allowed the campus to smoothly shift gears and meet this unique situation. It also helped that a significant number of CWU's resident students live in western Washington and go home on weekends reducing the campus population and increasing the services that may be offered to others. At Washington State University, which received approximately the same amount of ash as CWU, the early over-reaction to the ashfall created confusion and generated much negative comment from the public.

Contingency plans did prove valuable but plans that had been field tested were the most useful.

There is always a cost benefit question raised in the development of contingency plans. This is particularly true when planning is being done for natural hazards or violent disruptions because there is often a tacit assumption that since the plans won't be needed, the time spent developing them is wasted time. Even minimal planning did prove valuable in responding to the Mount St. Helens emergency. Is there any reason to go beyond the bare minimum? There are, of course many reasons. Thinking about the "unthinkable" helps an institution respond more effectively when confronted with unpredictable situations. Participation in mock disaster once every two or three years lets you find out how the crisis team works and where the holes are in planning. It also removed contingency plans from the arena of completely abstract analysis. Most important is the evidence that planning minimizes the disruption of crises and maximizes the comfort, and safety of those affected.

Footnotes

1. Wilcox, Ray E. Physical and chemical characteristics of the Mount St. Helens deposits of May 18, 1980. Mount St. Helens Technical Information Network, Bulletin #8. Vancouver, WA: Federal Emergency Management Agency, June 2, 1980.
2. 3,000 Students at Washington State University Fleeing Ash. Chronicle of Higher Education, Volume XX, Number 14, page 4.
3. Ash particles and home clean-up problems--advice from the University of Idaho. Mount St. Helens Technical Information Network, Bulletin #7. Vancouver, WA: Federal Emergency Management Agency, May 30, 1980.
4. Poultry - Bees - Livestock. Mount St. Helens Technical Information Network, Bulletin #11. Vancouver, WA: Federal Emergency Management Agency, June 5, 1980.